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THE EUROPEAN WINTER AND THE WAR*

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BEFORE considering the effect of the winter upon the military operations in Europe, we may very well review, briefly, the general climatic conditions of the western and eastern theaters of war.

Western and northwestern Europe are roughly similar, climatically, not to the eastern United States but to the Pacific coast of North America north of Oregon. As we go east across Europe the winters become more and more severe, and we find ourselves in another climatic province, which extends from western or central Germany across Russia and far east across Siberia. A somewhat similar "Siberian" climatic region is found in western Canada, east of the Rockies, and extending some distance into the United States. The eastern war area is climatically intermediate between western Europe and central Russia, being less extreme than the latter and more extreme than the former. The plains of Hungary are roughly similar to our own Great Plains, and the Mediterranean portion of Europe is climatically like California.

Western and northwestern Europe are freely open to the sea. Their prevailing westerly and southwesterly winds are tempered by the relatively warm Atlantic waters. Hence the winters are mild. No such extremes of cold occur as are found farther east, at a greater distance from the sea. The average midwinter (January) temperatures over the western war zone are between 35° and 40°, i. e., about the same as those of Baltimore and Washington. In the eastern war area, the midwinter (January) mean temperatures run about 10° lower, or between 25° and 30°. Boston and Buffalo are much like Poland in their average midwinter temperatures. The lowest thermometer readings which observers in the western war zone are likely to make during an ordinary winter average between 5° and 15° Fahr., but they are between —5° and —15° Fahr. in the eastern war area. In any given cold winter, however, the temperatures may fall 10° or so lower than these averages. The effect of winter cold upon navigation is an important factor in all naval warfare. In western Europe, the North Sea harbors remain open, and navigation is not often or seriously handicapped, although occasionally, in severe winters, there is difficulty with the ice along the coasts and in the mouths of the rivers. In the Baltic, on the other hand, ice makes more trouble. Much of this sea is choked by ice, and most of the harbors and even the large rivers freeze. Ice-breakers, however, may be used to keep open the important ports when necessary, except in the farther north. The winters

* An article by the writer, entitled "The War and the Weather During the First Three Months of the Fighting," appeared in the **Popular Science Monthly** for December, 1914, and considered the weather influences upon the military and naval operations from Aug. 1 to Oct. 31. The present article will deal chiefly with the period from Nov. 1 to Jan. 31.

vary a good deal in their severity, and in their effects upon the freezing of the Baltic harbors. Over the eastern war zone the rivers, lakes and streams are ice-bound. The Vistula is usually frozen at Warsaw from the end of December until early in March. The Neva was this year closed to navigation early in November.

European winter weather goes through a series of more or less systematic changes under the control of passing storms which alternate with spells of finer, drier and more settled atmospheric conditions. The weather of Europe is mainly controlled by storms which, coming from North America, or beginning in the ocean area around Iceland, pass northeastwards across the northeastern Atlantic and over or near to northwestern Europe, their influence extending 200 or 300, or more, miles south of their centres. Many storms which we have experienced on our side of the Atlantic later cause snow and rain and gales on the other side. As the storms approach, and pass by, the wind-vanes of central Europe turn, with characteristic regularity, from southeast through south to west, a succession of changes which is, of course, perfectly familiar to us here. Europe thus undergoes many variations of temperature and of weather, as we do, but these changes are, on the whole, less rapid, less frequent and less violent than our own because European storms usually move more slowly and are less violent than ours. The Atlantic Ocean, the Channel, the North and Baltic Seas, and the adjacent coasts, being in the region which is nearest the storm tracks, are all subject to frequent and severe winter gales, with rain and sleet and snow-squalls, rapidly shifting winds, and thick weather. Such conditions make navigation in those more or less landlocked waters difficult and dangerous.

In comparing the western and the eastern theaters of war in winter, it is to be noted that both have advantages and both have disadvantages, from a military point of view. The temperatures average higher in the west. Therefore Belgium and France have more rain, more sleet, more mud, more "slush", than are found in eastern Germany, Austria, and Poland. The cold clear spells are of shorter duration in the west. They are more frequently interrupted by milder temperatures and thawing weather. But this physical relief, from the cold, is gained at the expense of added discomfort and suffering on account of the dampness, the hard marching, and the difficulties of transportation. In the west, the air is damper, so that the same, or even a more moderate degree of cold, often gives a greater sense of chill than where the air is drier. In the eastern war zone there is the disadvantage of greater and more continuous cold, but the advantage of somewhat more settled weather, and usually of more continuously frozen ground. In Belgium and eastern France the Germans find themselves in somewhat milder winter conditions than those which prevail over much of their own country farther east. If the Germans should penetrate into Russia, or the Allies into Germany, both sides would experience a gradually increasing severity of winter cold. Again, the Russians, in advancing westward, would be entering a milder climate than their own.

Most of northern continental Europe has an annual rainfall (including melted snow) between 20 and 30 inches. This is the same as that over a narrow belt in our own country east of the Great Plains, reaching north from the Gulf of Mexico, in Texas, to and across the Canadian line. In the eastern United States the rainfall is heavier. Along the Atlantic and Gulf coasts it averages over 40 inches and in places over 50 or even 60 inches. The rain is fairly evenly distributed through the year over most of Europe. The autumn and winter are somewhat the wetter seasons along the northern coast, while the warmer months are the rainier farther east, as in Russia.

From a military point of view, snow is usually more important than rain. The snow gradually becomes deeper as we go from west to east in Europe, because more of the winter precipitation there comes in the frozen form, owing to the lower temperatures. If all the precipitation of the colder months over the war area fell as snow, the total depth each month would average about 20 inches, this being, roughly, the equivalent of 2 inches of rainfall. Such, however, is not the case. In eastern and northeastern Prussia the ground during each of the three midwinter months is snow-covered for from two to four weeks, the average depth of snowfall per month being considerably less than 10 inches at places from which records are available. Farther east and southeast, in Russian and Austrian Poland, the snow is deeper, and the more severe cold keeps it from melting as rapidly.* These winter snows may become a serious obstacle to military movements, especially during severe and blinding snowstorms which come with cold winds. On the other hand, hard packed snow and frozen rivers and swamps give solid foundation for marching and for transportation.

The mountains of Europe everywhere have deeper snows than the lowlands. The Vosges and the Carpathians, e. g., the one in the western and the other in the eastern theaters of war, both often have their passes blocked by heavy snows. In the western war area the snow is more apt to be wet and to melt quickly, while in the east, it is drier and likely to remain longer on the ground.

Modern wars are intense. They do not come to a dead stop in winter. Armies do not go into winter quarters as they did in the old days. Modern methods of transportation are so well organized that winter storms and cold do not interfere as much as was formerly the case. Yet the movements of the heavy guns, the armored automobiles and the motor trucks of the present-day army are blocked by deep snows about as effectively as was once the case when guns and wagons were lighter, and when horses were exclusively used. And in spite of all our carefully-planned medical and hospital organization, there is much the same bitter suffering among the troops that, in former wars, made winter campaigns in northern Europe so terrible.

* Boston has an average annual depth of snow of 44 inches.

(To be continued)

THE WAR IN THE COLONIES

By Lawrence Martin
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The German Empire Overseas

THE colonies of the German Empire, which are threatened during the present war, cover an area of 1,134,640 square miles, or nearly 5 times that of Germany. They contain an estimated population of 13 million persons, including only 25,000 whites, while the parent country in Europe had 64,925,993 inhabitants in 1910. The chief colonies and dependencies are: *German East Africa* and *German South-West Africa,* each larger than the Fatherland; *Kamerun* also in Africa, and nearly as large as Germany; *Togo* on the Gulf of Guinea, and larger than Bavaria; in the East Indies and Pacific Ocean are *German New Guinea,* over half as large as Prussia, the Bismarck Archipelago, Caroline, Pelew, Marianna, Solomon, and Marshall Islands, and Savaii and Upola in the Samoan group; while German's only Asiatic possession is *Kiau-Chau* in China, west of Korea and about half way between Port Arthur and Shanghai.

Part or all of each of these pieces of German territory is now occupied by British, French, or Japanese forces. They have been taken by small detachments of soldiers and marines, sometimes without bloodshed, sometimes with minor skirmishes, and in no case except that of the 3 months' siege of Tsingtau in Kiau-Chau has there been any notable military or naval force.

Results of Extra-European Warfare

The results of the war in the colonies and dependencies of European countries from August 1, 1914, to January 15, 1915, are summarized below. Events in Europe and the Baltic, North, Mediterranean, and Black Seas in Turkish Armenia, and in Morocco and French North Africa, are not included.

GERMANY holds *Walfish Bay,** a British colony on the coast of German Southwest Africa, and perhaps a town in *British Central Africa.* Her soldiers have invaded *Portuguese West Africa, British Cape Colony, East Africa,* and *Uganda,* and have repulsed several British invasions of German East Africa.

German cruisers have also done much damage at Papeete in French *Tahiti;* cut a British cable at Fanning Island; bombarded *Madras* in India; sunk a Russian and a French warship in the British harbor of *Penang,* Malay Peninsula; put a British cruiser out of commission at *Zanzibar* off the eastern coast of Africa; destroyed many merchantmen in the *Indian* and *South Atlantic Oceans;* and decisively defeated a British fleet in the Pacific *near the coast of Chile.*

* Recaptured by the British on Christmas day.

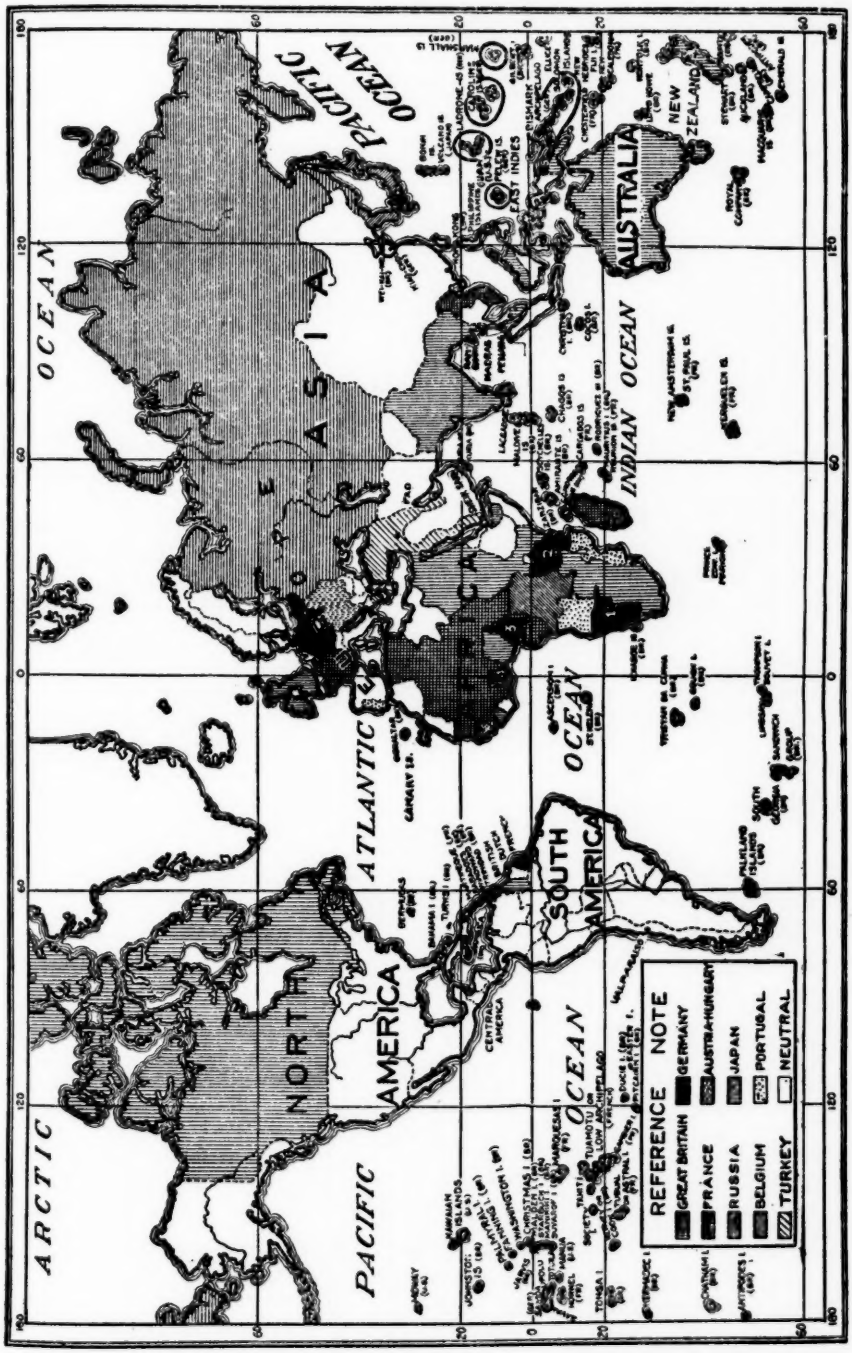

Fig. 1. The positions of the colonies of the leading European countries now at war. (Modified from a map in *The Literary Digest*). Neutral territory in white. Of the German possessions (shown in black) 1 is German Southwest Africa; 2, German East Africa; 3, Kamerun or the Cameroons; 4, Togo; 5, Kaiser Wilhelm Land in New Guinea; while the chief German islands (a) of Polynesia as Samoa, (b) of Micronesia as the Marshall, Caroline, Ladrone or Marianna, and Pelew Islands, (c) of Melanesia as the Bismarck and Solomon Islands, are outlined in black, as is Kiau-Chau in China.

FRANCE holds parts of *Kamerun,* a German colony in west Africa, captured by French and British forces.

also German Togo, captured by French and British troops.

French warships participated in the blockading of Kiau-Chau, the pursuit of the *'Emden',* and the bombardment of German towns in Kamerun.

JAPAN holds *Kiau-Chau* in eastern China, a German colony, captured by Japanese and British forces.

also *Jaluit,* a German port in the Marshall Islands.

also *Yap,* a German port in the Caroline Islands, the last two to be administered by British forces from Australia after Nov. 18th.

Japanese warships were the most effective at Kiau-Chau; assisted in the pursuit of the *'Emden';* caused a German cruiser to be interned at Honolulu; and captured two German auxiliary cruisers.

GREAT BRITAIN holds *Fao,* a Turkish port on the Persian Gulf, *Basra,* 60 miles, and *Kurna,* 165 miles inland, taken by troops from India.

also *Sheik Said,* a Turkish port, on the Red Sea in Arabia.

also *Cyprus,* a large island in the Mediterranean belonging to Turkey which has been administered by Great Britain since 1878, but is now annexed to the British Empire.

also *Egypt,* a Turkish subject-territory in which a British protectorate is now declared.

also German *Samoa* in Polynesia, captured by New Zealanders.

also *Herbertshohe* and *Rabaul,* German ports in New Pommerania, Bismarck Archipelago, taken by Australians.

also Bougainville and Buka in the *Solomon Islands* of German Melanesia.

also Nauru or *Pleasant Island* in German Micronesia.

also *Kaiser Wilhelm Land* or German New Guinea.

also German *Togo,* in western Africa, captured by British and French troops.

also *Dar-es-Salaam* in German East Africa.

Volunteer troops and regulars in British East Africa have repulsed several German invasions.

also *Kamerun* (see statement above under France).

also *Kiau-Chau* (see statement above under Japan).

also *Swakopmund* and *Luderitz Bucht* in German Southwest Africa.

Loyal colonial troops in British South Africa have put down a Boer revolution, and turned back several small German invasions.

The British warships have bottled up the *'Konigsberg'* and destroyed the *'Emden'* in the Indian Ocean; destroyed the German fleet in the South Atlantic *near the Falkland Islands* and Strait of Magellan; bombarded several Turkish and German ports; taken many German merchantmen; and confined the rest to neutral ports.

The AMERICAN fleet, including the Christmas Ship *'Jason'* with 5,000,000 toys and pieces of clothing for children in the Old World, the Red Cross ship *'Hamburg'*, the Rockefeller Foundation relief ship *'Massapequa'*, and other vessels from the United States, laden with food for the Belgians, cotton for the Austrian hospitals, etc., have taken every port in Europe by storm.

Geographical Relationships

Why was it that New Zealanders took German Samoa, while Australian troops captured the chief German port in the Bismarck Archipelago? How did it come about that Germans were able to acquire and hold England's colony on the southwestern coast of Africa, that French forces were the aggressors in Kamerun, Japanese at Kiau-Chau and the Marshall and Caroline Islands, and soldiers from India in Turkish Fao and Sheik Said? Geographical relationships help to explain all these apparently-complicated colonial campaigns of tiny groups of soldiers which have already resulted in the possibility of vast changes in the map of the world, in contrast with the slight shifting of the map of Europe where the largest armies the world has ever seen are at a deadlock. It seems worth while for teachers of geography to consider the geographical features of the war in the colonies in some detail, especially as we may soon be reading of larger conquests by Boer, Indian, Portuguese, Australian, and perhaps Japanese troops, for Germany seems to have no way of sending reinforcements to her colonies.

Sources of Information

The facts regarding the war outside Europe have been published in the daily papers in America, in the London *Times,* in the department headed *Unsere Kolonien und der Krieg* in the weekly edition of the *Tagliche Rundschau* of Berlin, and in the monthly issues of *United Empire* published in London. The monthly numbers of *Koloniale Monatsblätter* and *Koloniale Rundschau,* both published in Berlin, were not seen for issues later than August, 1914.

Reading for Teachers

The geographical significance of the series of events can only be appreciated by referring to a good atlas or globe, or even such an outline map as is published with this article (Fig. 1). Statements in English regarding the topography, climate, products, population, trade, garrisons, etc., in addition to the generally-excellent descriptions in the grammar school geographies, will be found in the *Statesman's Yearbook* for 1914, in Chisholm's *Handbook of Commercial Geography,* in Bartholomew's *Atlas of the World's Commerce,* in Jefferson's *Atlas of Commercial Values,* in Mill's *International Geography,* in the volumes of Reclus' *The Earth and its Inhabitants* and Stanford's *Compendium of Geography and Travel,* in the *Baedeker Guide Books,* and in the more recent encyclopedias.

Reading for Students

The books listed above are adapted for reading by teachers, and their more mature students, but the pupils may very well be set to looking up (a) certain products and trade routes in the *Commercial Geographies* of Adams, Brigham, Gannett, Redway, Robinson, Smith, Lyde, Morris, Trotter, Gregory, Keller, and Bishop, and others, or (b) specific places, alluded to in the war news, in the *Geographical Readers* by Carpenter, Chamberlain, Winslow, Rupert, Huntington, King, and others, in Herbertson's *Descriptive Geography from Original Sources,* Lyde's *Geographies of the Various Continents,* in such series as *Little People Everywhere, Around the World, Peeps at Many Lands, The World and Its People, Boy Traveller, Family Flight, Zig-zag Journeys, Home and World, Highways and Byways, People and Places, Youth's Companion Series, Little Folks from Many Lands, Scenes from Every Land,* etc. They may also look up pictures in the back numbers of the *National Geographic Magazine, The World's Work, Harper's, Scribner's,* and other magazines. Best of all they may now, more profitably than at any time in the history of the world, have their interest stimulated by some bit of war news and then be sent to the school reference shelf or the public library to look up some topics and countries alluded to in the *References to Books and Articles* in such geographies as the Tarr & McMurry, Dodge, King, Redway and others.

War Maps

The writer has found it profitable to make a flag map in accordance with the following plan: Take a large wall map of the world on Mercator projection. Buy a quantity of tiny flags of foreign countries (40 cents a gross). Pin a flag, say of Germany, Japan or Great Britain, at each place alluded to in the list on pages 172-175. where conquest of colonial territory has taken place, as at Walfish Bay, Kiau-Chau, Togo, etc. The pin holes do no serious damage to the map.

Pin other flags at places where naval battles have occurred, as (a) southwest of Valparaiso in Chile, (b) near the Falkland Islands, (c) at Cocos Island where the *'Emden'* was destroyed, and so on. On these latter flags place gummed numbers. Make a legend explaining these numbers, to attach to the map. It might read, for example: "1. German cruisers sink 2 British cruisers; 2. British fleet sinks 4 German cruisers; 3. German cruiser *'Emden'* bombards Madras; 4. The *'Emden'* sinks a Russian and a French warship at Penang; 5. Australian cruiser sinks the *'Emden'*."

Next, connect by threads the flags at Madras, Penang, and Cocos Island and you have a rough route of part of the cruise of the *'Emden'*. Do the same with strings or colored threads between the flags showing where two German cruisers bombarded French Tahiti in the Society Islands, and where they fought the English off the coast of Chile, and later near the Falkland Islands. To this thread will be attached one indicating the route of another German

cruiser from Yap in the Caroline Islands to Fanning Island, where a British cable was cut, and St. Felix, where a collier was destroyed. Another thread joining these two will come from San Francisco, where a German cruiser started on her way to join the fleet which fought off the Chilean coast.

As an antidote for all this warfare, put in pins and a thread to show the route of the American Christmas Ship *'Jason'* from New York to Plymouth, England, Marseille, France, Genoa, Italy, and Salonica, Greece.

If flags are not easily obtainable take ordinary pins and use pieces of red paper for British flags, black for German, blue for French, white for Japanese, etc. The plates at the front of Webster's Dictionary show flags, which students might copy, using colored pencils.

School children of all ages from the grades to the high school, normal school, and university can play this geographical war game with pleasure and profit. If they are allowed to do the looking-up of places, the pinning of flags, and the stretching of threads for themselves they will remember the location of Madras, Tahiti, the Falkland Islands, Zanzibar, Plymouth, Samoa, etc., all the rest of their lives. The facts can be stated without prejudice, so that no race antagonism or war spirit need be stirred up by the study of the geography of the war in the colonies.

Of course the same methods apply equally well to a graphic representation of the campaigns in Belgium, France, Poland, East Prussia, Galicia, Servia, and Armenia upon a map of Europe.

Germany's Relationships With Her Colonies, Contrasted With England and France

In these instances of extra-European warfare the geographical factors of the peripheral settlement and the undefended seaport constitute a weakness especially if the German influence is strictly limited to the port, as in many new colonies and most tropical dependencies. French, Japanese or British ships could capture such German colonies as Samoa, Togo, or Kaiser Wilhelm Land, and perhaps Kamerun, by bombarding the seaports, and then starving out the traders and colonists in the interior, provided there were no German navy at large upon the seas. It would require an army, however, to conquer most of the important British colonies, which have been established longer, contain a larger white population and have in the interior farms and towns which are populous and more nearly self-supporting, as in British South Africa. This is also true in a measure of German East and South-west Africa. The German colonies are also too new to send troops to the defense of the parent country as the British colonies of Canada, Australia, New Zealand, and India, and the French colonies of northern Africa, are doing. The colonies and foreign possessions of Germany are all young, so that her present trade with them is relatively slight compared with her trade with the United States, Russia, and other foreign countries. Germany's exports are worth nearly 2,500 million dollars, while her imports exceed 2,600 million dollars annually, but only about 1/55 of this trade, or 92 million dollars, is with the

dependencies of the German Empire. Their total trade in 1912 was 114 million dollars.

The trade of France with her colonies was about 137½ million dollars in 1912, the exports and imports being about equal in value; but in addition these colonies had a trade of over 171 million dollars with other countries. The total exports and imports of France in 1913 were valued at nearly 3077 million dollars. This is less than half as much as the total trade of Great Britain, however, which was worth almost 7021 million dollars in the same year, but Great Britain's trade with India, and with her dominions, colonies, protectorates, and dependencies constituting the British Empire, aggregated some 2000 million dollars. This great colonial trade in the long-established, far-flung British Empire, in contrast with the little trade of the thirty-year-old colonies of Germany, with less than one-seventeenth of this amount, suggests the stakes for which the European countries are playing on the high seas and in the antipodes. It emphasizes the importance of the war in the colonies.

THE ASSOCIATION OF AMERICAN GEOGRAPHERS

THE eleventh annual meeting of the Association of American Geographers was held in Chicago on December 29 and 30, 1914. The President, Prof. A. P. Brigham of Colgate University, gave an address on "Problems of Geographic Influence." Prof. N. M. Fenneman of the University of Cincinnati conducted a Round Table on "The Delineation of Physiographic Provinces in the United States." Prof. R. D. Salisbury gave an evening lecture on Porto Rico. Thirty-seven papers were offered, 6 dealing with Physiography, 2 with Climatology, 1 with Oceanography, 3 with Regional Geography, 5 with Economic Geography, 9 with Anthropogeography, 5 with Political Geography, 4 with Educational Geography, and one each with Phytogeography and with Exploration. A dinner was held the evening of Dec. 30.

Teachers of geography will be especially interested in the endorsement by the Association of American Geographers of the scheme for forming a National Association of Geography Teachers, as suggested by Mr. G. J. Miller in the *Journal of Geography* for October.

For the coming year the Society elected the following officers: President, R. E. Dodge; First Vice-President, Mark Jefferson; Second Vice-President, Frank Carney; Secretary, Isaiah Bowman; Treasurer, F. E. Matthes; Councilors, William Libbey, R. DeC. Ward, and A. H. Brooks. The Society accepted with regret the resignation of Prof. R. E. Dodge as Editor of the *Annals of the Association of American Geographers*, appointing Prof. H. H. Barrows in his place. The attendance was about 50. The Society is indebted to Professors Salisbury, Goode, Barrows, and Tower and to the University of Chicago for entertainment and for luncheon on Dec. 29 and 30.

The *Annals* of this society, advertised on a later page, would be a substantial addition to the library of any normal or high school.

A GLIMPSE AT NEBRASKA INDIAN GEOGRAPHY

By Melvin R. Gilmore
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WHEN the nature and scope of what is here termed the Indian Geography of Nebraska is understood, it will be seen that the limits of this paper can afford only a glimpse of the subject.

Since geography is the study of the earth's relation to life, the science may be divided into physical geography and biogeography. Physical geography deals with the natural conditions of land, water and air, and their interrelations. Thus we may consider the physical aspects of the earth as a whole or of any part of it. Biogeography, or the study of the life relations, depends upon the physical geography. Biogeography is considered under the subheads, phytogeography, zoogeography, and anthropogeography, or the distribution and activities of mankind.

Indian geography of Nebraska, is a discussion of this region in relation to the occupation by the aboriginal tribes. A moment's thought gives us to understand that the distribution and interrelations of all forms of life have greatly changed in the last century, and especially in the last half century. In that time, the human population of Nebraska has not only increased from probably twelve thousand persons to more than one hundred times that number, but the native race and all its activities have been replaced by a population, which, though, in some degree cosmopolitan, is overwhelmingly European racially and wholly European culturally. Strange as it may seem I daresay that much less is known of the arts and industries, the food, the clothing and housing, the political organization, the religious and philosophical attitude of mind of our native Americans, than is known of the Asiatic races. We know more of the mythology, the literature, and the government of Japan than we do of the myths and mythological places of Nebraska, or of the stories and the political structure of the tribes which so recently occupied the region where we now reside. We know more about the sagas of Norway than we do about the hero songs of the Omahas and the Pawnees.

The great change in the human population has involved enormous changes in the character and distribution of the plant and animal life in this region. Within less than forty years the native prairie flora has been wholly eradicated from vast areas. These tracts have been planted with grains, grasses, fruits and vegetables which we brought with us from Europe, besides the dandelion, burdock, mullein, catnip, and many other plants which have accompanied us and have established themselves just as the rats and mice also have done. Besides this, towns and cities and roads have been built, and groves and parks have been planted where no forest growth was seen before. Accompanying these floral changes necessarily have come great faunal changes. Where herds of tens of thousands of the native American cattle, the buffalo, grazed only a few decades ago not one individual is now to be seen. Instead there are herds of European cattle. And so with the deer, antelope, and other native animals; they have been displaced by animals from Europe.

A year ago White Horse, of the Omahas and over 80 years old, said to me: "When I was a youth, the country was beautiful. Along the rivers were belts of timber land, where grew cottonwoods, maples, elms, oaks, hickory and walnut trees, and many other kinds. Also there were various vines and shrubs. And under all these grew many good herbs and beautiful flowering plants.

"On the prairie was the waving green grass and many other pleasant plants. In both the woodland and prairie I could see the trails of many kinds of animals and hear the cheerful songs of birds. When I walked abroad I could see many forms of life, beautiful living creatures of many kinds, which the Master of Life had placed here; and these were, after their manner, walking, flying, leaping, running, feeding, and playing all about.

"Now the face of the land is all changed and sad. The living creatures are gone. I see the land desolate, and I suffer an unspeakable sadness. Sometimes I wake in the night and I feel as though I should suffocate from the pressure of this awful feeling of lonesomeness."

The subject of my paper comprehends only something of the geography of Nebraska relating to its occupation by the tribes of the American race. First of all it should be remembered that the American race is not all one people, but comprises many stocks, just as does our Indo-European race. There are fifty-six different linguistic stocks in North America north of Mexico. Of these there are within the bounds of the United States tribes speaking two hundred languages. In Nebraska there are tribes of three different stocks speaking at least six different languages. These stocks are the Siouan, Caddoan, and Algonquian. Of the Siouan stock there were in the region of the North Platte River and along the northern border of what is now Nebraska several tribes of the Dakota Confederacy. On the lower Niobrara River was the Ponka tribe. The Omaha were in northeast Nebraska, and the Oto in the southeast. West of the Omaha and Oto was the Pawnee nation of four tribes, extending from the Niobrara River southwestward to the Solomon River. The Pawnee nation is of Caddoan stock. The Cheyenne and Arapaho of the Algonquian stock lying in eastern Colorado extended over a little of the southwest part of Nebraska. Among these tribes the relations sustained between the Omaha and Pawnee were uniformly friendly; the relations between these two tribes and the Dakota were uniformly hostile. As for the relations between these and the other tribes of the region, they were sometimes friendly and sometimes hostile. The Cheyenne and Arapaho held the farthest southwestern outpost of the Algonquian stock, their nearest relatives being the Chippewa of Minnesota, from whom they had been wedged off by the intrusion of the other two races, the Caddoan and Siouan. The Pawnees had migrated into this country from the southwest. According to their own traditions and from other evidence, it appears that the tribes of the Siouan stock had migrated from the east, their westernmost group, the Teton Dakota, reaching the Black Hills about the end of the eighteenth century. Ever since they seem to have been pressing southward upon the Pawnees, so much so that just before the settlement of Europeans in this region, the pressure had

compelled the Pawnees to abandon their villages on the Loup River and on the middle course of the Platte and to settle on the farthest eastern verge of their territory close to the Omahas and the Otos. The sites of these settlements are at the present town of Leshara and just across the Platte opposite Fremont.

The circumstances of physical environment surrounding the tribes of the plains of western America were less favorable to advancement than the conditions which surrounded the tribes of western Europe where our civilization developed. Still, these tribes had come an immense distance on the road from savagery to civilization. They contained in embryo all the powers and capabilities for achieving a form of civilization of their own, which would, of course, differ from that achieved by our own race in other environments, but still a manner of social and industrial life containing all the essentials of that organized complex of activities which we call civilization.

Before the advent of the European there was no beast of burden in North America except the dog. This limitation was an important factor in the control of certain forms of activity. However, in the arts of life there had been some attainment in agriculture, architecture, weaving, dyeing, basketry, pottery, and pictography. The tribes had developed systems of government, rituals of religion, and the beginnings of medical and surgical practice. They had also incipient forms of literature and the art of music. They had their historians, their geographers and explorers.

The character of the floral life of a country is a strong factor in determining the faunal life, and both are highly influential in shaping the material culture of the human inhabitants. The physical environment and material culture are reflected in the intellectual, religious, and philosophical expressions of a people's life. Their myths, legends, rituals, stories and songs are to be fairly interpreted only in the light of knowledge of the material basis. The character of the arts and industries and religious observances of the various American tribes were largely conditioned by the distribution of the native wild plants which supplied their alimentary, medical, and protective needs. Certain of their uses, when known to us, may be suggestive of possibly useful acquisitions to our list of plants of economic value to our agriculture and horticulture. Since these plants have already naturally established themselves here they must be fairly well adjusted to the physical conditions here prevailing. It is reasonable to suppose that if promising species were subjected to cultivation and selective breeding they would show as much improvement and more hardiness than representatives of the same orders which we have brought with us from the old world, for the wild ancestors of our common cultivated plants were probably no more promising in their original wild condition than the native plants are here.

Besides the wild fruits, nuts, tubers, and seeds which were regularly harvested from the wild growths by the tribes of Nebraska, they had also certain crops which they regularly cultivated. They planted fields of corn,

beans, squashes and pumpkins, gourds, watermelons, and tobacco. They had all the types of corn and many varieties of each type, especially of flour corn. They planted the different varieties in separate fields to avoid hybridization. Their beans, squashes, and pumpkins were of many varieties.

All the tribes in the Missouri River basin lived in permanent villages of which the major controls determining their location were the presence of wood, unfailing water, and sufficient ground suitable for tillage where they could plant their fields. Then the abundance of game and wild fruits and other useful vegetal products had their influence as contributory factors; thus the proximity of the Missouri River and of the Elkhorn, Platte, Republican, Blue and Nemaha Rivers were favorite places of abode.

The villages were not laid out in blocks but consisted of an irregular cluster of houses without streets. The mode of structure of these houses shows the influence of physical environment upon the type of architecture. While the tribes in the heavily forested eastern part of the continent used logs for building, or a covering of bark over a frame of posts and poles, here, because of the scantier supply of timber a different house was evolved. A building site was chosen and a circular space of twenty, thirty, forty, or fifty feet in diameter was excavated to the depth of a foot and one half or two feet, a bench of earth of suitable width to serve as a seat by day and a bed by night was left at the circumference of the circle. Near the center four heavy forked posts fifteen to twenty feet high were set. Then a circle of posts was set where the wall was to be. These posts were shorter than those in the center in order to give slope to the roof. In the forks of all these posts, timbers were laid which supported the rafters. Poles were then laid on the rafters, interwoven with willow withes and thatched with prairie grass. Over all this a firm covering of earth was laid. Light and ventilation were had by a circular opening in the dome of the roof. The fireplace was in the center of the floor. In order to control the draft of this opening so that the wind would not drive the smoke back, a frame was erected around it so that a mat or skin could be laid up on the windward side. A vestibule about ten or fifteen feet long and seven or eight feet wide and eight feet high was placed at the east side of the lodge. This was the only entrance. In the yard near by was a scaffold for drying meat, pumpkins, and wild fruits for winter stores of food. Another adjunct of the dwelling was the bathlodge. This was a small dome-shaped frame of willow poles over which could be thrown mats or skins; in the center was a number of boulders. These boulders being heated, water was poured on them to cause steam for a vapor bath.

In travel, the shelter was the conical tent with a hide cover which could easily be folded and carried on the march. The camp was arranged in a circle, each band of the tribe having its own place in the segment. So a man coming into camp at any time of day or night and at any place wherever it might be, would know at once where to find his own family.

In erecting the tent three of the poles were first tied together with a long rope. The three poles were then set up with their bases spread the distance of the diameter of the tent. The other poles, in all about a dozen, were laid in the fashion of soldiers forming "stack arms", and the long rope before mentioned carried round the circle of poles and tied to one of them to make the tent frame firm. Next the cover was drawn up and secured by fastening it together at the front. Then the smoke flap poles were inserted in their sockets so the smoke flaps could be manipulated, opening towards the lee side of the tent to give good draught and ventilation.

The hunt was organized and officered under strict discipline, for it was a socialized industry and any mishap might subject the whole tribe to great hardship and suffering or even famine. So plans for the apprehension of the herds and the killing, skinning, and cutting up of the meat had a definite duty in what was a community undertaking for the common welfare.

Certain minerals were of economic use to the Indians. Salt was obtained near where the city of Lincoln now is. Salt was also sometimes imported from regions in Kansas and Oklahoma. Certain clays were used for making paints, others for dyes. Bentonite was used for cleaning feathers and furs. A medicinal clay was obtained in Colorado somewhere in the vicinity of Denver. It was applied for the reduction of inflammation. Selenite crystals were reduced to powder by heat and the powder was used in cleaning off the excess glue after attaching an arrowhead to the shaft. Catlinite, or red pipestone, was prized by all tribes for pipe-making. It was obtained in southwest Minnesota.

Previous to the appearance of the white man upon their horizon, the tribes had rules and methods of procedure, but by European incursion there was thrust upon them a train of problems without precedent and they had to make the best of a desperate situation. Not the least bewildering of the new ideas thrust upon them was that of individual holding of land regardless of use. This idea and that of alienation of lands was contrary to their customs, to their conceptions of justice and reason, and to their religious ideas.

Within the bounds of the tribal domain the land was held as common property of the tribe in its corporate capacity; none was held in fee by any individuals or group of individuals. But in suitable situation, convenient to the village, each family chose such ground as it needed and could cultivate. Such a piece of ground was held in undisturbed possession so long as the family kept it in actual cultivation and use, but, if cultivation of it lapsed, it was subject to reapportionment for use; for the idea of monopoly and speculation in land or of alienation of the same was just as foreign to the Indian mind as the same process in regard to the air or water or any other natural resource needful to the sustenance of human life and equal human opportunity.

Along with the idea of the common right of all men to a dwelling place on earth, the American tribes held to the idea of the common right of all men to the natural products of the earth so far as they needed and could use them;

the natural and common right to plants for any use, for food, timber, fiber, and so forth; the right to natural mineral products, as salt, catlinite, bentonite and other clays; the natural and common right to fish and game. No individual or group of individuals was allowed to monopolize any natural resource. No person or corporation could hold the location of deposits of salt, clays, or any other natural product to the exclusion of others. Everyone had equal opportunity of access to natural products; but individuals who put forth effort and possessed themselves of any natural substance thereby made it their own property and had the right to give it away, or trade or dispose of it as they saw fit. What a man's efforts produced were his own, but the bounties of nature were common wealth.

Indian geographic names ought to be ascertained and preserved for the purpose of history and scientific study, if for no other consideration. But these are not the only grounds for their preservation. They give distinctive character to local nomenclature, and perpetually recall events and circumstances of romance, and stimulate the imagination.

All of our rivers and creeks, lakes, notable hills, and other natural features have different names applied by each tribe acquainted with them. Thus the great river along our eastern border is called Mini-shosè by the Dakota, Ni-shudé by the Omaha, and Kits' Paruksti by the Pawnee. These are descriptive names and show something of Indian psychology. The Dakota noting the turbidity of the stream, called it Muddy Water, *mini,* water, and *shose,* muddy. Another feature impressed the Omaha mind. Bars of very fine white sand are frequent in this river. As an instance to show the poetic interpretation of natural phenomena by the Indian mind, I may relate an incident. One time, driving towards the Missouri River in company with an Omaha Indian, he drew my attention to the appearance of the sky close to the horizon just above the river. The summer sun was bright and the seasonal south wind was blowing strongly. Just above the river drifted white, trailing clouds of the fine sand from the bars. He pointed and said: "Now you see why we call this river Ni-shudé." *Shude* is the Omaha word for smoke, and *ni* is the word for water. The awe and wonder pertaining to this stream impressed the mind of the Pawnee and they called it the River of Mystery, Kits' Paruksti. In the Pawnee language, *paruksti* means wonderful, mysterious or sacred, and *kitsu* means water.

The name of our state is itself a variation of the Omaha name of the largest river within the state, Ni-bthaska, Flat Water. The French explorers in mapping the region rendered the name into their language, so we have it Platte River. The Omaha name is strikingly descriptive of the river, *bthaska* means flat, and *ni,* water. The Pawnee also call it the Flat River. In their language it is Kits' Katush, from *kitsu,* water; and *katush,* flat.

The Dakota call it Pankeska Wakpa, Shell River, from *pankeska,* shell, and *wakpa,* river. This name commemorates the fact that formerly the Dakota were accustomed to obtain shell ornaments by barter from another tribe

which they met at this river. The name of Niobrara River is a variation of its Omaha name, Ni-ubthatha, Spreading Water, from *ni,* water, and *bthatha,* spreading. The Dakota name of this river, which is Mini Tanka Wakpa, carried the same idea, from *mini,* water, *tanka,* large, and *wakpa,* river. The Pawnee name is also descriptive, but seizes upon another characteristic. Their name for it is Kits' Kakis, Running Water, or Swift Water, from *kitsu,* water, and *kakis,* swift.

The Sand Hills, a distinct topographic area of Nebraska, is called Chasmuta by the Dakota, from *chasmu,* sand. The Omaha call this region Pahe Pisa, from *pahe,* hill, and *pisa,* sand.

These are a few of the geographic names current among the tribes of Nebraska, and will serve to show their manner of applying place names. Some of their names are descriptive of physical aspects or of supposed occult properties, other are commemorative of events or of men.

NOTES ON THE HUMAN GEOGRAPHY OF AN OIL FIELD

By John L. Rich
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Introduction

THE following discussion, which relates particularly to petroleum, but in many of its aspects applies as well to natural gas, is an attempt to present from the standpoint of one phase of modern geography certain characteristic features associated with the development of an oil field. The particular human "responses" commonly associated with oil are described, analyzed, and their causal relation to the basic facts concerning the nature and occurrence of the resource demonstrated. The discussion is based on the idea that these human responses include any distribution of population, either permanent or temporary; any grouping or arrangement of cultural features such as buildings, roads, etc., or any peculiarities, either physical or psychological, of man himself which are characteristically and causally associated with, and controlled by, a natural resource or such other basal geographic elements as topography, soils, climate or location. These responses demand description and their causal relations call for demonstration and analysis.

Each of the natural resources utilized by man necessarily exerts an influence whose character and strength depends, in the main, on the nature of the resource—its distribution; its physical properties, and the means by which it is procured. All these determine in large measure the part which it plays in the life of man and in the geography of the region where it occurs.

Significance of Nature and Mode of Occurrence of Oil

Two peculiarities of the mode of occurrence of oil are among the prime factors upon which its geographic significance depends: These are (1) its occurrence deep down within the earth entirely out of sight, often with no surface indications of its presence, and (2) its localized distribution within

the general producing area. The combined effect of these peculiarities is to introduce into the prospecting for and development of oil fields a strong element of uncertainty and risk of loss while at the same time the nature of the resource insures an easily gained fortune to those who make a lucky strike. The effect, in short, is to introduce a strong gambling element, and to promote the "boom" or "rush" response wherever a successful field is found.

Before proceeding to the discussion of these responses it might be well to consider a little more closely the factors mentioned above. In most cases the oil lies far underground and gives no direct indications at the surface of its presence below. Occasionally a seepage at some spring or watercourse attracts attention and leads to drilling, but in many cases the discovery is entirely accidental—made in the course of drilling for water or of random prospecting for oil. Whether or not oil will be found in an untried area becomes, then, in the absence of expert examination, merely a gamble. The invisibility of the oil-bearing sands tend to increase the element of mystery which, in the popular mind, is likely to be associated with the whole subject of the distribution of oil and thereby to increase the effectiveness of the gambling element connected with its development.

Further, the laws of accumulation of oil are such that its distribution is often exceedingly irregular, even within the general oil field. Producing wells and dry holes occur in close proximity and even on adjoining locations. In most fields the oil is found only where the rock structure is favorable for its accumulation in considerable quantities. Such structures are the crests of anticlines and domes or places where dipping rocks locally flatten out into terraces. Wherever ground water is present, oil, being lighter than water, tends to migrate up the dip of the rocks. Wherever, in its upward migration, it encounters such structures as those mentioned, especially if they include an impervious stratum, it tends to accumulate.

Even favorable structures, however, do not yield oil in quantities unless a porous stratum is present which is capable of holding the oil and delivering it quickly when a well is drilled. Moreover, oil is not always found even in cases where a suitable "sand" is present and structures are favorable, for a break in the impervious stratum above, or various other conditions may have allowed its escape. Thus, even after examination of the structure by a trained geologist, a considerable element of uncertainty necessarily enters into the search for oil.

The "Rush" Response

The first well in an untried region is almost a pure gamble and its sinking is accompanied by many of the features of a gamble. Curiosity is rife and the well is constantly visited by a throng from far and near. At one such well a booth established for the sale of soft drinks to the visitors seemed to be flourishing. When the well approaches the depth which it is expected will determine whether or not it is to be successful, the excitement increases. Amidst a crowd of expectant onlookers drilling is continued throughout the

night by the aid of torches. Should the well prove successful the rush begins. Quickly the news spreads to all the country round. There is a scramble to secure leases on farms situated near the successful well. Oil men from far and near come in, each vying with the others to obtain favorable leases. Speculators lease large tracts in the hope of disposing of them at a profit to some one of the bona fide oil companies in case the field develops as is hoped. All the towns in the neighborhood become the centers of ceaseless activities; hotels are crowded; garages are filled to overflowing; even the railroads are forced to extra efforts in order to accommodate the increased traffic involved in the bringing in of the necessary drilling outfits, casing, and other supplies. Drilling outfits are put into position with feverish haste, each company endeavoring to get its wells down first to reap the benefit of the greater flow which comes from the first wells, and which may be greatly cut down as neighboring wells are sunk. Soon the oil field becomes a forest of derricks.

Following the rush to the immediate neighborhood of the first well, there usually comes more or less of the so-called wild-catting—the sinking of wells in surrounding territory in the hope of striking new fields, or of locating the continuation of the main field. The most striking characteristic of this wild-catting is its blind, groping nature, and the predominating element of pure gamble which is, therefore, involved. This is especially conspicuous in such a region as Illinois, since the glacial drift obscures the underlying rock structure—the only possible guide which might be used in the intelligent location of outlying wells. It is true that the geologist is now being called upon to some extent to determine in advance the structure of the area, and therefore the most favorable locations for development work, but in most cases the blind and expensive method of cut and try is still in vogue.

Interesting psychological responses associated with the gambling element already described are almost invariably noticed in connection with a newly opened oil field. Excitement is in the air, everyone is talking oil, and every stranger is suspected of being an oil man seeking leases. Almost every landowner for miles around will tell you that somewhere on his place, in a well or spring, or along a stream, there is a peculiar scum on the surface of the water, which he is sure is oil.

Another of these responses probably has its root in the obscure and, to the lay mind, rather incomprehensible facts controlling the distribution of the oil. Practically without exception, the landowner on whose farm a dry hole has been put down will assure you with the utmost confidence that he is certain the drillers struck oil in that well, but are concealing the fact. He cannot see any reason why oil should be found on his neighbor's farm, but not on his own, and he is suspicious of everyone.

Influence of Topography

In a district already proven, topography plays a subordinate part in the location of individual wells, since, as a rule, there is no necessary connection between the underground structure, which controls the distribution of the

oil, and the surface topography. Topography does, however, effect the depth to which it is necessary to drill, and the ease with which the drilling materials may be put in place. It is also an important element to be considered when it comes to the question of installing the pumping apparatus to be described in a following paragraph.

Topography seems to exert a marked influence on the location of the wild-cat wells, at least those whose sites are chosen by the old blind method, for, since it is in the valley bottoms that the amount of rock drilling necessary to reach a given stratum is least, it is there that the majority of the wild-cat wells are located.

Cultural Features

Besides the "rush" response, whose geographical basis we have just outlined, a successful oil field calls into being a number of distinctive cultural features which must be considered as geographical phenomena associated with, and dependent upon, the exploitation of this particular resource. The forest of derricks, already mentioned, which is so conspicuous, though transient, a feature in certain oil fields, is of course a response to the necessity of drilling to secure the oil. Probably the next most striking features, which include the pumping house and the arrangements for pumping the wells, result from the necessity, at least in most fields after the first few days, of pumping the wells in order to maintain a continuous flow of oil. From the pumping house, which is usually a rather plain structure, large enough to house a good-sized oil engine with various accessories, there radiates to the wells a series of "pull rods" connected with them by an arrangement, the "jack" whereby a pull on the rod actuates the pump. At the pumping house the rods are hooked to a large drum, the pull wheel, which, as it constantly turns back and forth through about one-fifth of its circumference, gives the necessary pull to the pumping rods. These rods must be kept fairly straight, hence in rough country considerable difficulty may arise. Where the country is not too rough they are supported on stakes driven into the ground to such a depth that their tops give the desired gradient. The squeaking of the pumps, and of these rods as they move back and forth over the tops of the stakes, is an exceedingly characteristic sound in an oil field, as is also the constant chug-chug of the pumping engine.

Besides the pumping house, rods and jacks, there is usually associated with each group of wells, at least with the wells of each distinct company in the field, one or more tanks for the storage and measurement of the oil before it is pumped away through the underground pipe lines to distant refineries or storage tanks. In addition there is likely to be found at some point convenient to a railroad in the neighborhood of any large oil field, a so-called tank farm, which is merely a considerable area given over to the storage of oil. Such a farm may number hundreds of steel tanks, each nearly a hundred feet in diameter and about thirty feet in height, set at nearly uniform distances of about three hundred feet from each other for protection in case of fire. Such

a tank farm is a sight calculated to impress one in a never to be forgotten way with the enormous amount of liquid fuel which is wrested from the earth in some of these larger oil fields.

Pumping arrangements, settling tanks, pipe lines, storage tanks and tank farms all must be looked upon as responses induced by the liquid nature of the resource, and quite different from those associated with resources of other kinds.

After the first boom of a new field is over, and most of the drilling is done, the human response to oil contrasts strongly with that to coal, iron or most of the other mineral resources. In the case of coal, there are the mines with their extensive buildings and equipment, the railways and tramroads, and finally the mining town with its more or less characteristic population. Such resources draw to themselves a considerable permanent population. Not so with oil: One or two men at each of the pump houses, and a few gangs engaged in repairing pumps, pipe-lines, etc., constitute nearly all the people who remain in the field after the drillers depart.

Influence Upon Agriculture

When it happens that an oil field is discovered in the midst of a good farming region, the influence of its development upon agriculture is striking and usually deplorable. The large sums of money which the owners of the farms often receive from leases or in royalties not infrequently result in the farmer's moving to town, leaving the farm to a tenant, or even in extreme cases, abandoning it altogether. Fields completely run to weeds, unkempt fences, and uncut crops were most common features in one such area recently visited. The gambling spirit and the spirit of "get rich quick" which certainly is very pronounced in the early history of an oil field, must be presumed to have their influence upon such farmers as remain and to discourage the hard labor necessary to secure the slow but surer rewards of farming.

Aside, however, from such psychological effects, the development of an oil field exerts in a most practical way its detrimental influence upon the agriculture of the region, for the derricks, the wells, and the numerous pumping rods radiating in all directions from the pumphouses interfere very seriously with the cultivation of the land and, in some cases, where the wells are thick, actually make cultivation almost impossible except by hand—a method which is not likely to be used extensively in this country for some time to come. Furthermore the waste oil and salt water escaping from the wells is often a source of serious injury to growing crops. After the productive life of a field has passed and the derricks, pumping apparatus, tanks and other accompaniments have been removed, agriculture regains, gradually, its former importance, but the recovery is apt to be slow.

Summary

With the discovery and exploitation of an oil field there are associated a number of phenomena which may be interpreted as responses to oil as a factor of geographic environment. Chief among these responses may be mentioned:

1. The boom or rush which commonly follows the opening of the field and is accompanied by a strong gambling spirit with its usual train of consequences.

2. Characteristic cultural features among which the most important are included under the items of working equipment such as derricks, pumping houses, rods and jacks, tanks, pipelines, etc.

3. The scant permanent population attracted by oil as compared with other mineral resources such as coal, iron, or zinc.

4. The demoralization of agriculture.

5. More or less well defined psychological effects.

At the basis of these responses seem to lie the following facts concerning the nature and distribution of oil:

1. It lies buried out of sight within the earth.

2. Its mode of accumulation is such that its distribution is often patchy and difficult to predict.

3. The two preceding features introduce a strong element of uncertainty and risk into its development.

4. It is a liquid—a fact which introduces many special features into the method of handling it.

5. It frequently requires to be pumped from the wells.

6. It has a high value and at the same time may, under favorable circumstances, be secured at comparatively little expense—hence the lure of easily acquired wealth.

CORN AND HAY

By M. Frances Warren
Mt. Pleasant, Michigan

BY a study of maps and charts, and year book, locate the distribution of the corn region in the United States. Make a study of the surface to get drainage, slope, and soils necessary for successful corn raising.

2. Study maps showing distribution of rainfall during growing-season—also charts showing probable killing frosts in spring—and first killing frost in fall (very important) also average summer temperature (all this to know climate needed to raise corn successfully).

3. Sum up the geography of corn growing, as to location, surface, and climate. Compare with conditions necessary for successful wheat raising (the study of the wheat industry came before this work on corn). Study latest year book to find maximum production in United States by states—as a whole—in other countries—Russia, India, etc.

4. Human factors entering in:

Education as to seed that will yield the largest returns as to quantity and quality.

Best soil preparation. Best method of planting, cultivation, and harvesting.

Adequate and efficient labor. Capital invested in above. Adequate transportation of corn.

5. Compare above with that of other countries.

6. Uses of corn: Locate the distillery centers of the United States. Why so located?

Canning and by-products. Feeding by silage. Feeding by grain.

7. Markets of demand for corn.

8. Study maps showing number of hogs per square mile in the corn belt. What conclusions do you draw? Locate the centers of the meat-packing industry in the United States. Why in the corn belt? (In the region of supply—saves transportation of raw product—near markets of demand—adequate and efficient (refrigerator cars) transportation of meat and meat by-products.

By-products of swine, lard, sausage, etc.

9. Our export trade in pork, and by-products.

10. Uses of hay: Rotation of crops. Feeding.

11. By a study of charts, maps, year book, locate the region where hay is an important crop. Name other grains raised in this region. Their uses. Discuss hay-raising and alfalfa-raising farther west as to surface conditions, climate, cultivation and harvesting.

12. Study the maps and charts showing number of cattle per square mile in the corn belt and the hay and alfalfa region farther west. What conclusions do you draw?

Compare with cattle industry of other countries.

13. Problems: 1. Why are we exporting less corn each year?

2. Why is meat so much more expensive than it was 20 years ago?

14. Cattle raised for two purposes: Meat and Dairying.

15. Beef cattle.

Locate regions in the United States where raising cattle is an important industry. Compare size of ranches now with those years ago. Compare care and feeding now with years ago. Compare density of population in regions of demand for beef and veal with those same regions 20 years ago. Carefully bring out these points:

a. Decrease of size of grazing region—greater demand for grain feeding.
b. Agriculture crowding out grazing region also.
c. Increased population—increased demand for meat.
d. Demand for young meat increasing.
e. Increased cost of land and grain.
f. Labor problem.
g. Demand for better care of cattle—government inspection.
h. Cost of better transportation—better, more careful methods used now.

What conclusions do you draw? 2. Which help to solve the problems? Give the solutions.

Locate the meat packing centers of the United States. Give reasons why this is such an important industry in these cities—Chicago, Kansas City, Kansas; South Omaha, Neb.; St. Joseph, Mo.; Indianapolis.

a. Nearness to region of supply.
b. Adequate transportation, from region of supply to these cities —care on trip there.
c. Adequate labor.
d. Within reach of capital to invest.
e. Near markets of demand.
f. Adequate transportation to these markets (refrigerator cars, quick transportation).

Discuss large stockyards, care of cattle while there, slaughtering, use made of every part of animal (by-products). How does the above add to the solution of your problems?

Discuss value of refrigerator cars in shipping meat to home markets—refrigeration in exporting. Countries to whom we ship meat. Compare our industry (beef cattle) with that of Argentina, and other countries. Routes of transportation abroad.

16. Dairying Industry.

Problems: 1. Why have substitutes for dairy products become so important, and so widely used? 2. Locate other parts, than the ones now intensively used, that will be used in the near future for cattle used in dairying industry.

Discuss the great importance of the dairy industry in the United States. The milk problem of the great cities today. Locate centers of this industry. Why necessarily near these cities? Why passing farther west? How does New York state rank? Wisconsin?

How does the care of cattle differ from years ago? Increased cost of feeding cattle. Housing of cattle at increased cost—modern barns. Great difference in dairying processes. Importance of new inventions—1. separator. 2. Babcock tester (to measure amount of butter fat in milk).

Need of decreasing the *number* of dairy cows, but increasing the *best* producers.

Discuss the increased amount of milk daily by certain feeding. Food values.

Dairying industry greatly influenced by markets. Locate these markets of dense population where there is a great demand for milk, butter, and cheese. Effect of milk refrigeration upon distance of milk routes. Distance that milk can be carried at same price. Value of quick, cheap transportation.

From the above, account for the increased cost of production of dairy products to the farmer—to the buyer. What substitutes may be used instead of dairy products? Compare the cost of these with the dairy products. What

conclusion do you draw as to their use instead of dairy products? What solution would you give to the problem?

If a new invention is a success in which, by the use of electricity, milk is prevented from spoiling for a greater length of time, from what distant states in our country can we obtain fresh milk? Why from Texas? How far does this aid in the solution of your problem? Locate another region. Discuss the possibilities of the southern states—of the New England states in this industry, in regard to your problem.

Discuss dairying in other countries—Switzerland, Germany, etc. Compare with United States. World value. From what countries do we import cheese? Trace routes of travel for this. Ports.

Other world needs are taken up and studied in much the same way.

Materials used in this work: Corn products exhibit, dairy products exhibit, many pictures.

Reference books: Robinson's "Commercial Geography." Salisbury, Barrows, and Tower's "Elements of Geography." Smith's "Industrial and Commercial Geography." Adams' "Commercial Geography." Chisholm's "Commercial Geography." Keller & Bishop's Book for Grammar Grade Children. Carpenter's "How the World is Fed." Allen's "Industrial Studies in the United States." Year Book for 1913.

CURRENT GEOGRAPHICAL NOTES.

Conservation of the Potato Crop in Germany

Germany's import of cereals is greatly curtailed by the prohibition of cereal exportation from some of the neutral countries, as well as by the danger of seizure as contraband when transported from non-contiguous territory. As a result the Empire must depend to a greater extent than usual on its own resources.

This matter has already been brought by various announcements to the attention of the farmers and the general public. More intensive farming, if such be possible, has been planned, as well as greater care in the conservation of products hitherto considered as waste material. For example, potato peelings and beet heads are now retained in the country or even collected in the cities and returned to the farm to be used as cattle feed. While the potato crop has always been an important factor in the food supply of the Empire, special efforts are being made this year to further its conservation. Fortunately, the crop is an abundant one.

In normal times, on an average from 3,000,000 to 4,000,000 tons of potatoes rot because of their large water content. Efforts have been made in the past to avoid this waste by the erection of drying plants, and Germany has had for some time quite a number of these institutions. Because of the present dependence on its own resources, it has been deemed necessary greatly to increase their number. For the sale of dry potatoes, a large syndicate is to be

formed, to which the factory owners are pledged to deliver all their products except what they need for their own use.

The content of water which normally amounts to approximately 70 per cent, can not be more than 15 per cent in the dried product.

The sale of the produce should be excellent, in view of the scarcity of cattle feed. It should increase correspondingly with the consumption of potato flour for baking. Many bakers have already made bread with an addition of from 10 to 20 per cent of potato flour, of which half was made from dried potatoes. In view of the fact that potato flour is about 8 marks ($1.90) per 100 kilos (220.46 pounds) cheaper than rye flour, this should tend to lower the price of this necessary food product.

A further considerable conservation of both potatoes and cereals for food purposes has been effected by the decision of the Government to cut down the production of alcohol by 40 per cent.—[*Daily Consular and Trade Reports,* Dec. 1, 1914].

The Cape Cod Canal

Cape Cod is known as the graveyard of sailormen. For 2½ centuries Cape Cod has been an obstacle in our Atlantic coast-wise traffic. Millions of dollars worth of ships and cargoes have been lost on the banks, shoals, and rocks near Cape Cod. During the last half century there have been 2000 shipwrecks on and very near this cape, with loss of 700 lives, and annual loss of half a million dollars' worth of property. By means of the Cape Cod Canal, which connects Buzzards Bay and Cape Cod Bay, such dangers can be avoided to a very great extent. This sea-level canal, which has converted Cape Cod into an island, is 7½ to 8 miles long, plus 5 miles of approach channels. The maximum height of the peninsula is only 29 feet. The canal has a minimum bottom width of 100 feet and a twenty-foot depth of water, which is to be increased to twenty-five feet immediately. Such dimensions may seem small because we are used to hearing figures which relate to the Panama Canal, but nevertheless the Cape Cod Canal is very high in rank because (1) dangers which have caused so many wrecks in the past can easily be avoided by way of the canal; (2) the distance between Boston and southern ports is reduced by 62 to 73 miles; (3) the cost of transportation is reduced by amounts ranging from 7 to 12 cents per ton, and the rate of insurance is cut from 12% to 4%; (4) the prospective annual tonnage is 25,000,000, where as that of the Suez Canal is 20,000,000, the estimate for the Panama Canal is only 10,600,000 and for the Erie Canal about 4,000,000; (5) the Cape Cod Canal has high value to our navy for strategic purposes. The $12,000,000 which the canal cost was furnished chiefly by August Belmont and associates. There was no government assistance. The work was completed in 5 years and the canal opened July 29, 1914. [References to literature on the subject: J. W. Miller, *Cape Cod and its Canal,* Board of Trade, Sandwich, Mass.; Mrs. C. R. Miller, Leslie's Weekly, July 2, 1914; The Literary Digest, Aug. 1, 1914; *The Opening of the Cape Cod Canal,*

Bull. Amer. Geog. Soc., Vol. 46, 1914, pp. 832-834; *Cape Cod Canal Nears Completion,* Technical World, Vol. 22, 1914, pp. 56-58; *Conquest of Cape Cod,* Harpers Weekly, Vol. 53, 1909, p. 13; *New Canal and old Cape Cod,* Harpers Weekly, Vol. 42, 1908, p. 16]. —M. K. DAVIS.

THE LOESS SOILS OF SOUTHWESTERN OHIO

In the southwestern part of Ohio, including most of Hamilton, Clermont, and Brown counties, the northwestern part of Adams county, the southwestern portion of Clinton county and the southeastern part of Warren county, is found an area of soil different from that found in any other section of the state. Except in the valleys and on some of the slopes, all the soils have been formed from a silty layer known geologically as the "loess."

The loess is believed to consist of glacial rock flour ground up by the action of the ice, carried southward by the waters resulting from the melting of the ice, deposited in the valleys, and afterward swept on to the uplands by the action of the wind. In this way a layer, with an average thickness of about 5 feet, was deposited over the uplands in the southwestern portion of the state. It is from this layer that the loess soils of southwestern Ohio have been formed.

When laid down by the wind, the deposit of loess was doubtless very uniform in character and, if the drainage conditions had been the same over the entire section, only one kind of soil would have been formed from the loess. However, a difference in drainage conditions, with the consequent difference in the processes of weathering, has given rise to two distinctly different types of loess soils with all stages of gradation between them. Where the surface is sufficiently rolling to permit the water to run off rather rapidly after rains, the soil is a yellow brown color and had been called the Cincinnati silt loam; but, where the surface is level and water remains after rains until most of it is removed by evaporation, the soil has become a very light gray to white in color and has been called the Clermont silt loam.—[*Ohio Agric. Exp. Sta.,* Circular No. 146].

THE MONSOONS, AND NAVIGATION NEAR CEYLON

At "Adam's Bridge," where the island of Ceylon is close to India, a railway has now been completed which crosses all but one small gap. In order that the ferryboats may keep to the leeward side of the peninsulas and islets which go by the name of "Adam's Bridge," it is necessary to shift from the northern to the southern waters with the shifting from the summer monsoon to the winter monsoon.—[*Scientific American Supplement,* p. 136, Aug. 29, 1914].

GEOGRAPHY IN THE PERIODICALS

Mr. D. W. Strayer discusses "Second Term Geography for City Schools" in *School Science and Mathematics* for November (Vol. 14, 1914, pp. 704-710).

American Education for September, 1914, contains a set of Regents' questions on geography, as given in an examination in June, 1914. There are 14 questions and the correct answers are printed in full.

The relationships of the French forests in the war zone to the conduct of the present campaigns is described in most interesting style by S. T. Dana in Volume 20 of *American Forestry,* November, 1914, pp. 769-785.

By good fortune the National Geographic Society had planned for, and published in the August number of its magazine, a large colored map, showing the new boundaries of the Balkan States. This excellent map, by Bartholomew of Edinburgh, happens to cover all of central Europe and the war zone of every campaign except that in Armenia. The *National Geographic Magazine* for September, October, November, and December has many good photographs of scenes and people in France, Belgium, Germany, Hungary, England, Russia, and Turkey.

The *Boston Transcript* for Nov. 25 contains an excellent description of the geography of the Masurian Lake District in East Prussia by Prof. E. H. Babbitt of Tufts College.

The *Chicago Sunday Tribune* for Nov. 1st contained a red outline map of Europe with a black and white overprint of the United States on the same scale, showing graphically the comparative sizes and distances of places in the war zone. It should have been acknowledged that the article on "The Russian Campaign in Germany and Austria," which we published in the *Journal of Geography* for December, was reprinted from the Chicago Sunday Tribune of Nov. 22.

The *American Review of Reviews* for November has an article on "The European Food Situation," by Prof. T. N. Carver of Harvard University, illustrated with the 5 maps by Mr. V. C. Finch of the University of Wisconsin which were reprinted in the *Journal of Geography* for December and the *Literary Digest* for Dec. 5.

The Autumn Number of the *Geographical Teacher* (Vol. VII, Part 6, 1914) continues the discussion of "Agricultural Geography of England on a Regional Basis," the present paper dealing with Yorkshire. In the same magazine are lists and descriptions of maps of the theatres of war (pp. 410-417), and two effective diagrams showing the preeminence of London over Liverpool among English ports in 1912 imports, and the reverse for exports, (pp. 397 and 400).

In the *Scottish Geographical Magazine* for December, Rev. J. Bryant describes the resources and history of the colonial possessions of Germany in the Pacific (pp. 643-644).

The *Geographical Journal* for October contains an article entitled "Some Rough War Notes" by Prof. L. W. Lyde, and an excellent list of maps of the seat of war.

The *World's Work,* which is always one of the very best geographical magazines published in the United States, devotes a large part of its December issue to the effect of the war on the Americas, and incidentally produces

one of the best treatments of certain phases of the commercial geography of South America now in print. Especially commendable are the diagrams showing the ratio of production of food-stuffs and manufactures in the United States to the small portion exported (p. 178); the imports of Latin-America and of the Orient and the portion supplied by the United States, the world's exports, and exports of the United States (p. 179); the factors in United States export trade (p. 180); and the 8 maps showing what South American countries export and where it goes (pp. 149-150).

Mr. O. W. Freeman contributes a study of the geographic factors influencing the State of Montana to the *Bulletin of the Geographical Society of Philadelphia* for October.

Prof. G. B. Roorbach has conducted a symposium on The Trend of Modern Geography, the results being published in the *Bulletin of the American Geographical Society* for November.

The *Scientific American* for Dec. 5th takes up "Climatic Factors in the European Struggle" stating among other things (p. 461) that the western theatre of war in Flanders has the climate of South Carolina, while the eastern, in Poland, has that of Iowa.

RECENT PUBLICATIONS.

THE QUATERNARY ICE AGE. By W. B. Wright. xxiv+464 pages. Macmillan & Company, London, 1914. $5.00.

Mr. Wright, who is a member of the Geological Survey of Ireland, has written the best general book on glacial features in Europe and America which has been produced during the present decade, and one which most colleges, normal schools, and good-sized high schools will need to add to their libraries. Its language is clear, its arrangement is attractive, every halftone and diagram and map is exceptionally fine and well-executed. The treatment is judicious, the auguments are marshalled but not lashed, and the conclusions are generally acceptable. It differs from many books published abroad in giving much space to the glacial geology of the United States. One reads with interest of glaciers and ice sheets, of drift deposits, and of the glaciation of the British Isles and the immediately-preglacial deposits there. The written proof of preglacial age of certain raised beaches in the British Isles is well reinforced by remarkable photographs and diagrams showing drift lying on old rock benches and against ancient sea cliffs. The history of the continental glacier in Europe from the Baltic center, and of the ancient glaciers in the Alps and in North America is followed by a good description of Lakes Bonneville and Lahontan and of the loess. After describing the Quaternary mammals and the relics of interglacial man, the author summarizes the theories of the cause of the Ice Age, and gives a resume of the Scandinavian oscillations of sea level in Quaternary time. The raised beaches of the British Isles, the warped shorelines of the Glacial Great Lakes in America, an isostatic theory of the changes of level of the land, and a review of postglacial changes

of climate in northwestern Europe round out this long-needed and highly-successful work.

THROUGH THE GRAND CANYON FROM WYOMING TO MEXICO. By E. L. Kolb. xi+344 pages. The Macmillan Company, New York, 1914. $2.00.

A straight-forward narrative of the journey of the Kolb brothers through the Grand Canyon of the Colorado in 1911. They tell of their adventures in following Major Powell's route, equipped with cameras and moving-picture machines, of what they saw and did and how they felt. The photographs are a little disappointing in view of the fact that these particular travellers make it their business to take pictures and were passing through the most wonderful work of nature; but there are one or two striking views, and the book contains enough geography and enough information about this wonderful canyon to make it well worth reading by any American.

ENGLISH INDUSTRIES OF THE MIDDLE AGES. By L. F. Salzmann, xi+260 pages. Constable & Company, London, 1913. $2.00.

An introduction to the industrial history of mediaeval England. No teacher or student of commercial geography can fail to profit from reading of mining and use of coal in England by contemporaries of Queen Elizabeth, of the use of iron from the Stone Age to the Seventeenth Century, and so on with the other mineral resources. Doubt is cast upon the identification of Devonshire-Cornwall as the source of the tin of the Phoenicians 500 years before Christ. Not a few geographical points are to be gleaned from the Salzmann's discussion of clothmaking, leather working, and brewing in the England of the Middle Ages.

WAVES OF SAND AND SNOW AND THE EDDIES WHICH MAKE THEM. By Vaughan Cornish. 383 pages. The Open Court Publishing Company, Chicago, 1914. $2.50.

We have many books on the work of glaciers, but few on the work of the wind. Yet the glaciated area in northeastern United States is not much larger than the arid and desert area in the Southwest. Another book on the eolian processes in relation to waves of sand is especially to be welcomed in America. Mr. Cornish has described and explained dunes, ripple marks, etc., in a well-illustrated volume.

THE ANTIQUITY OF MAN IN EUROPE. By James Geikie, xx+328 pages. D. Van Nostrand Company, New York, 1914. $3.00.

The description of the Glacial Period in Europe and the discussion of the antiquity of man on the continent are inseparably linked. There is no author so familiar with both topics and so eminent in both fields as Professor James Geikie.

There are no less than seven archaeological stages which precede the well-known Iron Age, Bronze Age, and Neolithic. In the earliest of these Paleolithic periods—the Chellean—the earliest man is known. The Chellean

comes in the second of the mild interglacial epochs. The testimony of the Pleistocene plants and animals, of cave deposits, river deposits, and glacial deposits, all point to the conclusion that man has lived in Europe for thousands of years, and perhaps for 2500 to 5000 centuries. The book contains an excellent summary of the glacial geology of Europe. It is illustrated by drawings and diagrams, and by superb halftones, and contains four colored maps which are new. These show the continent at various stages of glaciation.

THE REPUBLICS OF SOUTH AND CENTRAL AMERICA, Their Resources, Industries, Sociology and Future. By C. Reginald Enock, 544 pages, Charles Scribner's Sons, New York, 1913. $3.00.

This book may well be used as a text in colleges and it is a splendid reference book for the teacher of geography. It is interesting and full of the kind of information that the student of South American conditions desires. A chapter is given to Mexico and to each of the important countries of South America. Separate chapters are devoted to General Relationships, the Amazon Valley, the Aztecs, the Incas, Foreign Relations, Colonization and Commerce, and to Sociology and Future. The second paragraph of Chapter IV reads: "The great estuary of La Plata must be regarded as the commercial and maritime navel of South America. Towards this great inlet swarms of immigrants of the Latin race from the Old World have taken their way, and from it issues great store of food products of meat and corn, as if in the nature of compensation and return freight for the human cargo brought from Europe. The republic of Argentina, and to a much lesser extent Uruguay and Paraguay, together with a portion of Brazil, have as their physical basis the wide-spreading territory of the great pampas; the alluvial food-producing plains which are in some respects the principal and most valuable topographical and economic feature of South America; traversed by the great rivers which have their outlet in the estuary of the River Plate."

In a similar entertaining manner the author discusses the topography, soils, industries, commerce, government, people, education, amusements, political divisions, history, and future of Argentina. Buenos Aires is described very fully and some consideration is given to other cities. Each of the Republics is treated in like manner. F. E. WILLIAMS.

FIRST YEAR SCIENCE. By William H. Snyder, xvii+460 pages. Allyn and Bacon, Boston, 1914. $1.25.

This text, as stated in the preface "is the outgrowth of the effort of a committee of the Los Angeles teachers to make a simple, unified course in General Science for the upper grades of the intermediate schools and the first year of the high school."

"*First Year Science* deals with the earth and the sun in their relations to man." This sounds very much like a definition of physiography, in spite of the fact that "All subjects of elementary school science—physics, physiography, forestry and agriculture—are treated." The table of contents shows that

fully four-fifths of the subject matter is such as is found in the ordinary physiography. The book is interestingly written, in language that the first year high school student can understand. The illustrations are good. At the close of each chapter is a short summary and a list of questions. The distinctive feature of the book, however, is the experiments, 131 in number. These require but the simplest apparatus, and the directions are so interestingly worded that even a grown-up feels that he should like to perform them.

If this book is a fair sample of what First Year Science is like, that subject will make a most satisfactory substitute for physiography. Mr. Snyder has made the subject both interesting and practical. E. F. BEAN.

ELEMENTS OF GENERAL SCIENCE. By Otis W. Caldwell and William Lewis Eikenberry, xiv+308 pages, Ginn & Company, Boston, 1914. $1.00.

As a result of their six years' experimental work, in general science, in the first year of the University High School at the University of Chicago, the authors have produced a textbook of General Science which will have a decided effect in determining the future status of the subject. In solving the great problem of every teacher of elementary science, first the choice of material to be presented and, secondly its organization so as to secure unity and logical arrangement of topics, the authors state that they have chosen "a topical organization of those science materials which pertain to the home, school and community environment. In this organization little or no attention is given to the boundaries of the different sciences, each science being used as it is needed for a consideration of the topics selected. The unity which should be present in any science course is secured through the unity of the topics and not through the unity of any one differentiated science. The topics treated fall readily under five headings: I. The Air; II. Principally about Water; III. Work and Energy; IV. The Earth's Crust; V. Life upon the Earth." E. L. JAY.

TEACHING THE GEOGRAPHY OF THE WAR

Some schools collect newspaper maps and date them, but the lucid and inexpensive war maps of the London *Times* should and could easily be in every school. Liege, Brussels, Louvain, Antwerp, Verdun, Metz, Epernay, Alsace and Lorraine, the rivers involved, from the Rhine to the Meuse and Marne, and in the East, Warsaw, Cracow, Konigsberg, and many more can be located and to older classes something can easily be taught, with the aid of Baedeker, of each of these places as they become centers of interest; and the same is true of Servia, Galicia, Constantinople, the Balkan States, the Black Sea, boundaries between the different countries, why Germany, Austria and Russia feel shut in, and what they want, the Bagdad and trans-Caspian railroads, Salonica, the short land routes to India, the interests of each country in Asia and Africa—such things and many more can now be taught with no partisanship and without great difficulty and with great interest.—[G. Stanley Hall in the first number of ***School and Society.***]